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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,877	01/29/2001	Aomar Halimaoui	5310-03000	8711

7590 08/21/2003  
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EXAMINER

NOVACEK, CHRISTY L

ART UNIT PAPER NUMBER

2822

DATE MAILED: 08/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/744,877

Applicant(s)

HALIMAQUI ET AL.

Examiner

Christy L. Novacek

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 June 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 28-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 28-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is in response to the amendment filed June 2, 2003.

#### ***Response to Amendment***

The limitations added to claim 28 (predetermined regions of substrate being “exposed directly” to ion implantation) are sufficient to overcome the rejections of claims 28-30 under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi (US 5,918,116) in view of Bergeron et al. (US 4,157,268) and the rejections of claims 31 and 32 under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi in view of Bergeron et al. and Tzeng (US 5,215,934). Therefore, these rejections are hereby withdrawn.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 28-32 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Lines 5-6 of claim 28 recite the limitation of implanting ions of Ar, Ne or He into the regions of the substrate such that “regions of the silicon substrate are exposed directly to the implantation source”. This limitation is not supported by the specification.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi (JP 07-094503) in view of Chittipeddi (US 5,918,116, previously cited).

Regarding claims 28 and 29, Yamanishi discloses implanting ions of a chemical species such as argon (Ar) into predetermined regions of a silicon substrate (21) wherein the implanted regions of the substrate are exposed directly to the implantation source. The surface of the substrate is then oxidized to form a gate oxide layer of non-uniform thickness and MOS transistors are formed over the gate oxide layer. See Figure 4 and paragraphs 44-49 of the translation. Yamanishi does not explicitly disclose implanting the chemical species at an implantation energy of 2-15 keV. However, Yamanishi states that the process parameters of the ion implantation and the oxidation can be tailored according to the thickness of oxide that is desired (paragraphs 18, 30, 40, 49 and 51 of the translation). Like Yamanishi, Chittipeddi discloses a process of forming gate oxides of non-uniform thicknesses on a silicon substrate by implanting regions of the substrate with ions of a chemical species in order to increase the oxidation rate of these regions. Chittipeddi discloses that these ions may be implanted at energies ranging from 5 to 500 keV (col. 3, ln. 19-40). At the time of the invention, it would have been obvious to one of ordinary skill in the art to implant the ions of Yamanishi with an energy in the range of 5-15 keV because Yamanishi states that the ion implantation process parameters may be varied according to the thickness of oxide desired for a particular purpose and Chittipeddi teaches that implantation energies within this range can successfully accomplish an increase in the oxidation rate of a silicon substrate.

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Regarding claim 30, Yamanishi discloses that one example of an implanted dosage is  $5 \times 10^{15}$  atoms/cm<sup>2</sup> (paragraph 45 of the translation).

Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamanishi (JP 07-094503) in view of Chittipeddi (US 5,918,116, previously cited) as applied to claims 28-30 above, and further in view of Tzeng (US 5,215,934, previously cited).

Regarding claims 31 and 32, Yamanishi discloses that oxidizing the surface of the substrate may be accomplished by thermal oxidation in an atmosphere of dry O<sub>2</sub> at a temperature of around 900-1000 degrees C but does not explicitly disclose that this process is carried out in a furnace (paragraphs 20 and 22). Like Yamanishi, Tzeng discloses a method of thermally oxidizing a silicon substrate that has been implanted with oxidation-rate-enhancing ions (Abstract). Tzeng discloses that this oxidation step may be successfully accomplished by thermally oxidizing the substrate at a temperature of about 950°C for approximately 10 minutes in a dry oxygen atmosphere within a furnace (col. 6, ln. 9-15). At the time of the invention, it would have been obvious to one of ordinary skill in the art to conduct the oxidation process of Yamanishi within a furnace as taught by Tzeng because both Yamanishi and Tzeng are conducting the same type of oxidation process.

### ***Response to Arguments***

Applicant's arguments with respect to claims 28-32 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

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Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (703) 308-5840. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CLN  
August 6, 2003

  
Michael Trinh  
Primary Examiner  
bct SPE